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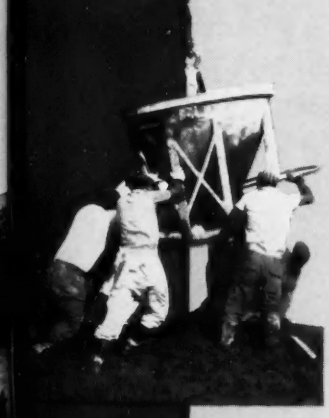
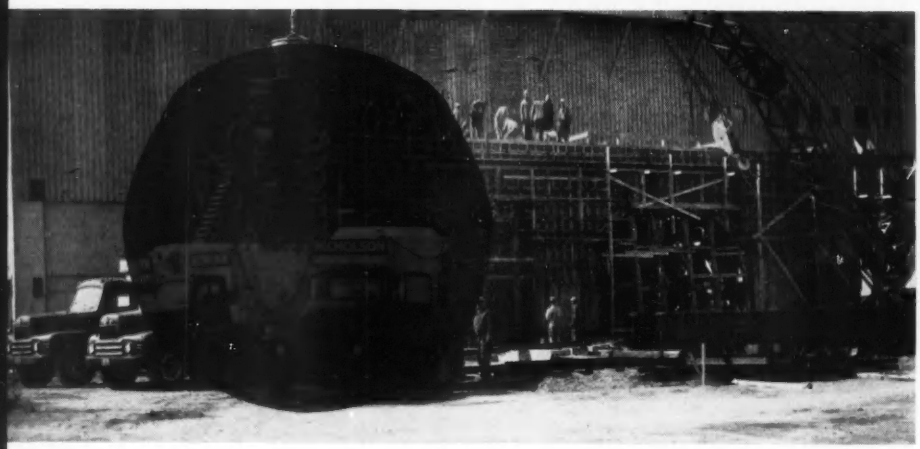
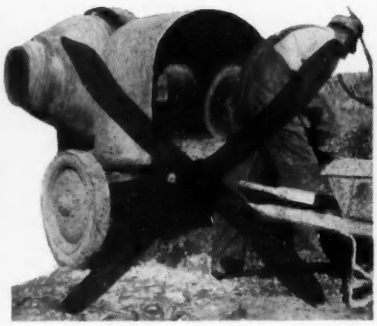
concrete construction

ARTICLES







We Expect Better Concrete Because It's Available

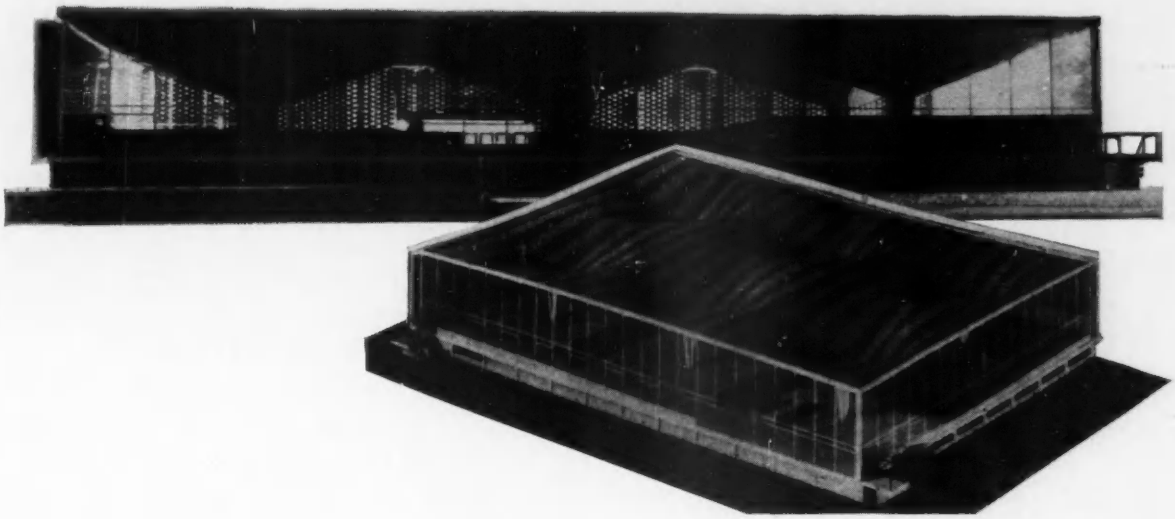
On every level and in every phase of the construction industry today there is increased awareness of the importance of rigid quality control in the production of concrete. Does this mean that there is more trouble with the performance of concrete today, as some old timers would have us believe?

Not at all! The truth of the matter is that at last contractors and engineers can insist upon (and get) rigid adherence to standards of quality control which were virtually unobtainable in the good old days that the old timers like to talk about. Why? Because the means for producing closely controlled concrete are today almost universally available through the facilities of the ready mixed concrete industry.

We do not make the claim that *all* ready mixed concrete is necessarily of the quality essential for good concrete work. But we do state unequivocally that the average quality of all concrete has been vastly improved by the wide availability of plant-batched materials mixed either centrally or in transit. There is no longer the slightest need for even the smallest job on the slimmest budget to settle for slap-stick methods in the production of concrete.

This is one of the unique and lasting contributions which the ready mixed concrete industry has made to the science of concrete construction. Its reality is eloquently pointed up by the dramatic year-after-year increase in the total utilization of ready mixed concrete, much of the gain being clearly and unmistakably scored at the expense of job-mixed concrete.

Our point is that the superior convenience and economies of ready mixed concrete, great though these advantages are, could not alone have won over the construction industry. Ready mixed concrete had also to prove itself on the basis of quality. This it has done so overwhelmingly that there has resulted a whole new concept of what may reasonably be demanded in the way of performance.



THIN SHELL CONCRETE FORMS UPSIDE-DOWN UMBRELLA ROOF

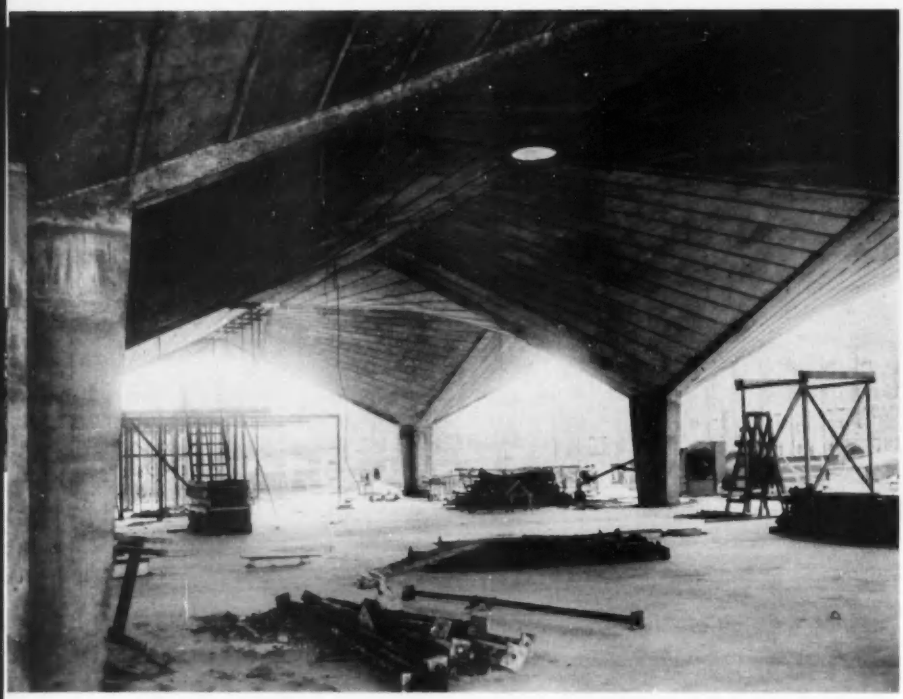
Thin shell concrete "goes to college" in this latest architectural innovation

STANDING AMIDST ARCHITECTURAL GOTHIC of an earlier period, the new Hunter College library in New York City is a striking innovation in concrete construction. The innovation will be seen to best advantage by students and faculty in the surrounding taller and distinctly traditional structures. They will look down at a roof resembling six separate upside-down umbrellas, with a surface pattern of alternating light and dark gray stripes to enhance its already dramatic appearance. Immersed, as students and faculty ordinarily are in a liberal arts college, in the heritage of the past, they will unquestionably be reminded that today's concrete builders are producing some of the most amazing changes in the structural face of the age in which we live.

The roof, which represents some important innovations in both design and economy of construction, is entirely of thin shell concrete. It consists of six structurally independent reversed umbrella shapes, which are key-locked at the edges and tied together with dowels to form an over-all area 120 feet wide by 180 feet long.

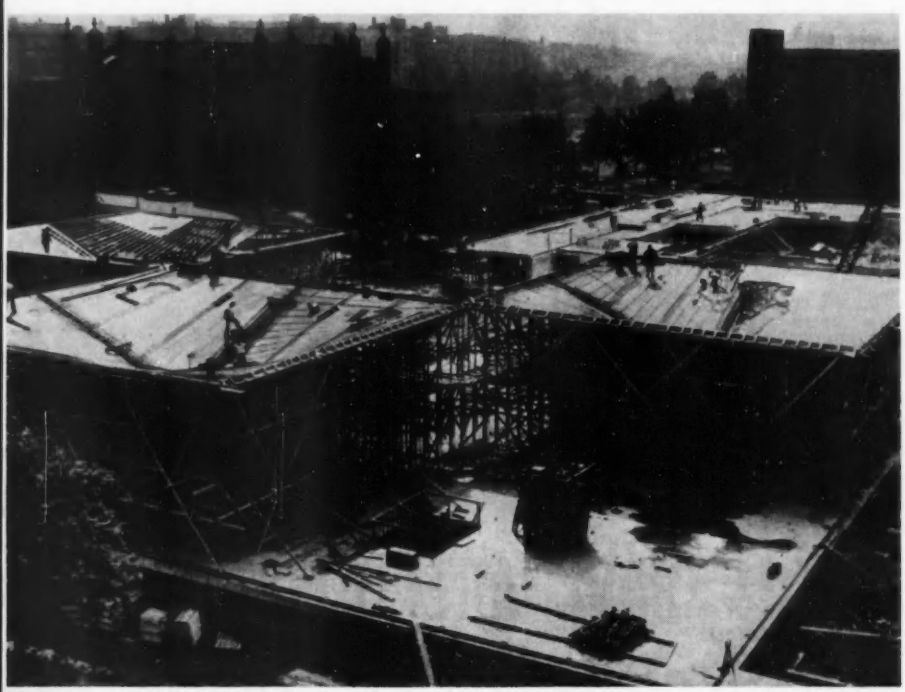
Each umbrella is formed by the joining together of four hyperbolic paraboloids of 3½-inch-thick concrete. The paraboloids curve downward 12 feet from the top edge to the lowest point at the center, where they are supported by a reinforced concrete column. Four compression ribs joining the paraboloids in each umbrella and a tension rib around the entire outer edge also help support the roof. The theory behind the umbrella design is that roof loads are transmitted from the thin shell concrete to the stiffener ribs by shear, and carried down the ribs by compression to the central supporting columns. Each umbrella section has a 60-foot clear span and a 30-foot cantilever.

The six columns supporting the roof of this one-story building—each shaped like a Roman cross—taper down from



Looking at the underside of the new Hunter College library roof. The huge inverted concrete umbrellas, showing ribs where the gaps between the plywood forms were filled in with grout, are an impressive tribute to the imaginative design and techniques applied by the builders.

Forms in place for the first two umbrellas. In umbrella at right, all reinforcing steel has been placed, and the next step will be concrete placement. Note in lower right-hand corner formwork for central column which will support another hyperbolic paraboloid.



the low point of each umbrella, 10 feet above the floor. They rest on 10-foot square footings which have been placed on soft rock 27 feet below the basement floor. In each column a drain has been placed to take rain water off the roof.

The forming work for the concrete roof is of particular interest in that straight 2-by-8-foot plywood panels were used to give the curved effect of the paraboloid. The panels (⅜-inch plywood sheets) assumed a naturally warped curve when placed in position, and it was not even necessary to clamp them down. The small gaps left between the panels to allow for warp were later filled with cement grout. The protruding ridges produced on the underside of the shells by the grout accentuated the curve of the umbrella design, thus adding a striking architectural effect of their own.

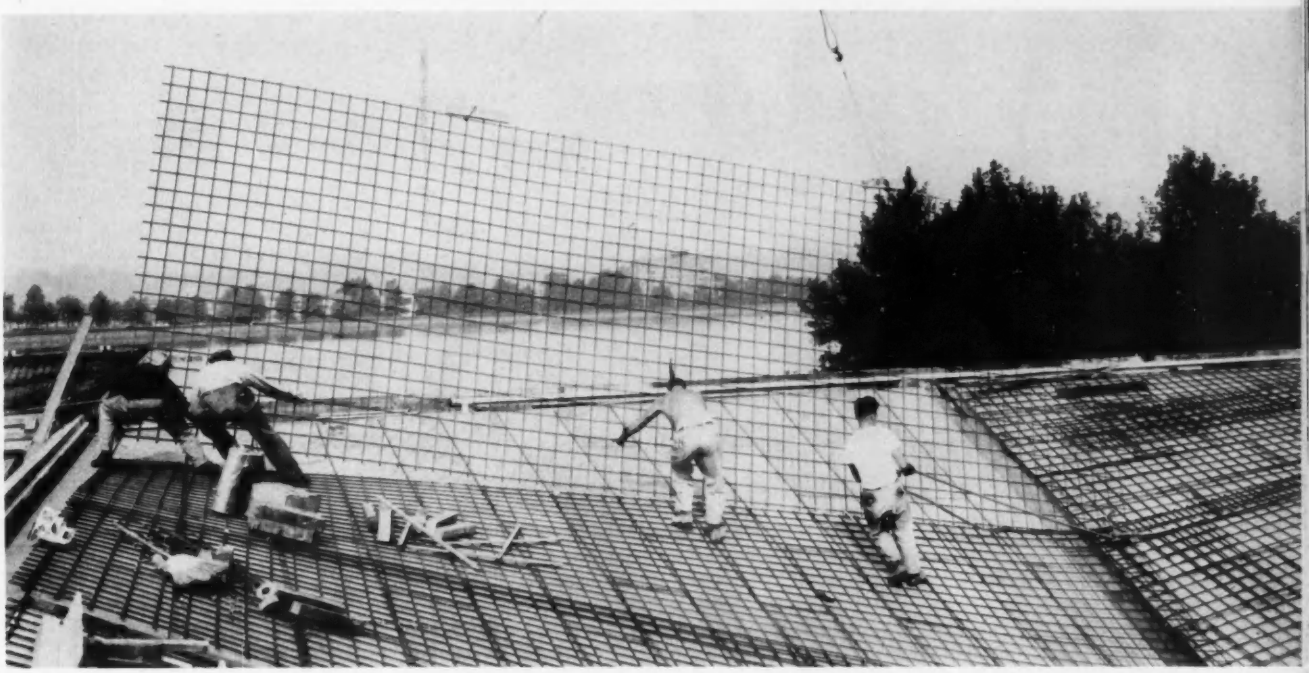
Three forms were constructed for the umbrella shapes and set up on the floor slab in a checkerboard pattern. After the concrete work on these was completed, the forms were reused once to construct the alternate three umbrellas skipped on the first time around.

The two-level falsework that supported the umbrella-shaped forms consisted of a 12-foot-high timber frame and adjustable metal shores.

Attention was also given to settling problems. For example, the roof's outside exterior corners were placed 1 inch higher than the final deflected dead-level position to compensate for settling after the forms were removed.

Special welded wire fabric mats were used to reinforce the thin shell paraboloids instead of individually placed bars. The mats, measuring more than 30 by 10 feet each with 6- by 6-inch wire mesh spacing, were selected because of their ability to drape and conform to the curved umbrella shapes. The slightly higher cost per ton of these prefabricated mats was outweighed by savings in time and labor. Placing of twelve mats for each umbrella, including positioning of 1-inch supporting chairs under the mats, was accomplished by a four-man crew in half a day.

A truck crane hoisted the 700-pound mats, which were then guided into place by the work crew, overlapped at least two wire spacings and "nested" so that there were only three thicknesses at the lap. There was at least a 1-inch cover of concrete above and below the wire fabric in the 3½-inch-thick shells.



Lather crew guides crane-hoisted mat into position. This is the final mat to be positioned for this shell. Each shell required twelve mats, or more than 4 tons of reinforcing. Mats were placed for a single shell in half a work day, saving both time and money.

After the twelve mats were laid and tied for each umbrella, the crew placed reinforcing bars for the stiffener ribs that joined the four paraboloids, and for the tension edges of the umbrella.

The six supporting columns for the library were also reinforced, each column containing forty-four vertical reinforcing bars.

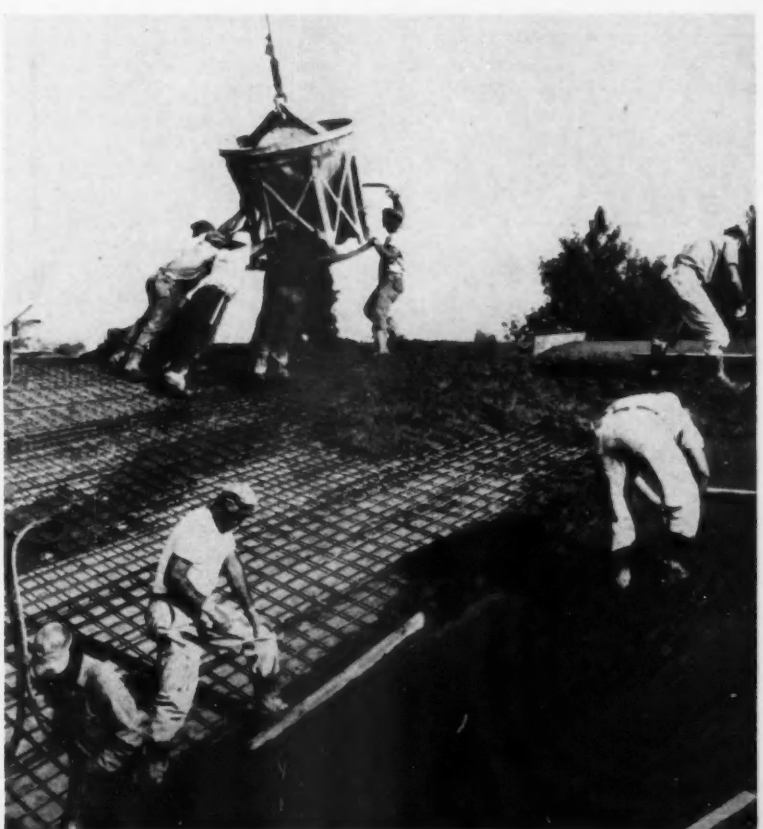
Because of the unusual structural characteristics of this job, a special high-quality concrete was required. The mix had to be light enough to substantially lessen the deadload and stiff enough to remain in place without running down the sloped forms. To produce these desired characteristics a lightweight concrete containing a retarding-densifier was used. Only five gallons of water was added per sack of cement, resulting in a mix with a 2-inch slump.

Strengths of 3,000 psi were obtained in seven days, making early form stripping possible, and 4,000 psi in twenty-eight days for the lightweight concrete. Specifications for the job called for 3,500 psi in twenty-eight days.

After all six columns were poured, the unusual and challenging concreting operations were begun on the umbrellas themselves. Each umbrella required 60 cubic yards of concrete and was completed by a fourteen-man crew in only one work day.

The concrete was chuted from ready mix trucks to a bucket, which was

As workers in background chute concrete from bucket, finishers rough screen the thin structural slab. Man in lower left foreground uses compressed-air-driven vibrator (see hose running up to gasoline-driven compressor) to work concrete down and under reinforcing fabric.



Concreting work for roof, columns, and floor slab complete, the new library, built to accommodate rapidly rising Hunter College enrollment, will be glass enclosed on all sides.

hoisted by crane to the umbrella top. There the workers guided the bucket into position, placing the concrete from the top edge and working down toward the center. After the concrete was vibrated, rough screeded, and rough finished, a chemical curing compound was sprayed on to prevent rapid moisture evaporation and to insure proper curing.

Great care was given to the stripping of the shores when the concrete had set. The shoring of each umbrella was removed in concentric rings, working from the outside inward so that the load would be gradually and smoothly transferred to the shell.

For purposes of insulation, the reinforced concrete roof was covered with a 3-inch thick layer of perlite. Mineral-surface rolled roofing was then applied for the finishing touch in alternating strips of light and dark gray, giving the additional striking feature to the structure mentioned earlier. The underside of the concrete roof was left exposed for its architectural effect.

The structural innovations of the new Hunter College library are of more than ordinary interest to concrete builders. The innovations actually proved highly efficient and yet low in cost for this single-story building.

In the first place, its unique design offers an interior relatively free of columns, which is not easily achieved at moderate cost by conventional construction methods.

Moreover, inherent in the design are several construction economies which made it possible to keep the building's cost within the moderate budget drawn up by the owner, while using relatively expensive materials. For example, in the use of the thin shell curved roof shape, less concrete was needed for a given area, resulting in a saving in cost of both material and construction time.

Certain other economies added to the owner's savings. Labor was saved because the roof concrete did not require finishing. Only rough screeding was employed to help bond it to the topping of perlite insulating concrete.

Still another economy was realized in forming the hyperbolic paraboloids. Since the compound curves, complex as they appear, actually consist of straight lines, it was possible to use inexpensive plywood for forms.

Finally, as was pointed out earlier, savings were made through the use of prefabricated mats of heavy welded wire fabric for the reinforcement.

Architect for the library was Marcel Breuer & Associates of New York City, concrete contractor was Dic Concrete Corporation of Elmont, Long Island, the general contractor was Leon D. Matteis & Sons of Elmont, consulting structural engineer was Farkas & Barron of New York City, and the ready mixed concrete was supplied by Ryan Ready Mix of Brooklyn. END

CONCRETE CONSTRUCTION MAGAZINE

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THREE STEPS TO CORRECT SURFACE DEFECTS

Rubbing the surface with a medium-grade carborundum stone to remove fins and any other projections and to fill in small air holes no more than a day or two old.

Covering up air holes with a cement-sand paste by rubbing it over the entire blemished surface with a wood float. On no account should a steel float be used, since steel will darken the surface and make the patch obvious.

Filling the air hole left by a form tie bolt. Notice the short rod used to ram the earth-dry mortar into the hole until it is thoroughly filled.

FILE: Finishing

Photos courtesy Cement and Concrete Association, London

Where a form wire tie, such as the one shown, is left exposed on the surface, the concrete around the tie must be chiseled away before cutting the wire back.

THE AMOUNT OF WORK that must be put into the correction of surface defects will depend upon how carefully the formwork has been erected and removed and on whether or not the concrete has been placed correctly. Close attention to proper procedures for forming and concreting will unquestionably reduce the effort required for final finishing.

If, however, after the formwork is removed, you see that certain corrective steps must be taken, the following suggestions may be helpful.

remove fins
curtains, and surface air holes

To remove fins, which may have formed in the joints of the formwork, or curtains caused by mortar running down the face of the completed surface, rub over the area with a fine or medium carborundum stone.

A carborundum stone will also fill up most of the smaller air holes, if the concrete is no more than a day or two old. If the concrete is more than a day or two old, a little more work is required. A mortar of 1 part portland cement and 1½ parts sand should be rubbed into the surface to fill in the holes. This can be done with the carborundum stone used for removing fins or with a wood float. When covering up air holes in this way, it is important to go over a wide area, not just the blemished portion, to avoid a patchy appearance.

patch holes
left by form bolts or ties

Ordinarily, the mortar used for patching holes of this size should be of the same proportions as the cement and sand used for the concrete. For example, the mortar used for patching a 1:2:4 concrete should consist of 1 part of cement to 2 parts of sand.

A patch will dry to a darker shade than the original concrete. To counteract this, thoroughly mix 1 part of white portland cement with 3 parts of ordinary portland cement. Then mix with the sand. The same type of sand should be used for the mortar as was used for the concrete, but it is advisable to screen it to remove the coarser particles.

If an exact match with the concrete is needed, let the concrete dry out completely and then mix several samples of mortar, using various proportions of white portland cement. Let these samples dry out completely, too. Then compare the samples with the concrete color for as close a match as possible.

Since concrete shrinks slightly as it dries and hardens, depending on the amount of water in the mix, the mortar should be mixed to an earth-dry consistency—leaving it just workable enough to place.

Before placing the mortar in the bolt hole, clean the hole by pushing a piece of cloth through it to remove grease or form oil. Next, wet the hole. Then ram the mortar well into it with a rod. Make sure that the hole is well packed by hammering with the rod.

Patching a honeycombed area involves cutting the defective part away, as shown. The exposed undersurface is then covered with a neat cement grout, applied with a brush after thoroughly cleaning and wetting.

The area cut away because of honeycombing must be completely filled in with mortar of an earth-dry consistency. A steel hand trowel is used for applying the mortar, but a wood float should be used for finishing.

Finishing the surface of a patch. Here, as elsewhere, the patch is distinctly visible although flush with the wall and matching in concrete color.

A board mark has been formed across the completed patch by lining up a board with the existing marks and rubbing it sideways. As you can see, this does much to conceal the repair work.

When it is completely filled up, wipe the outer surface with a damp cloth or rub down with a wood float.

If wire ties have been used for holding the formwork, these should be cut back and the surface patched to protect the concrete surface from rust staining. First, chip away the concrete around the wire tie with a hammer and chisel to form a small hole. Then cut the end of the wire at least ½ inch back from the face of the wall.

Prepare the area for patching by removing all loose pieces of concrete caused by the chipping and by washing off any dust or dirt. After thoroughly wetting the surface of the patch, apply a neat cement grout. Immediately after this application, ram or hammer the surface mortar well into the hole. Finish the patch by wiping with a damp cloth so that it is flush with the concrete surface.

correct honeycombing

The first step is to cut out the defective concrete as far back as the reinforcement, and if necessary behind it. Clean the exposed surface and wet it thoroughly. Then brush a neat cement grout well into it. Immediately afterwards, fill up the entire area that has been cut away with a mortar patch of earth-dry consistency. Finish the surface with a wood float.

Any board marks on the finished concrete surface can be carried across the patch by using the edge of a board to make a continuing impression in the mortar before it hardens.

If the surface of the concrete is to be tooled, make the patch in the way described above, but instead of mortar, use concrete of similar proportions and materials as that used for the job itself.

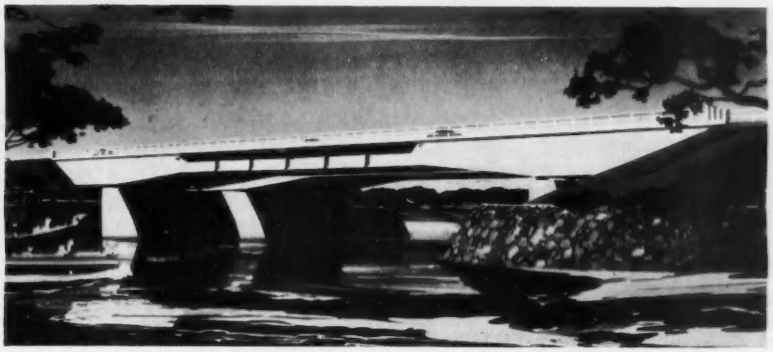
All patches must be properly cured, so spray them with water immediately after the surface has hardened sufficiently or cover them with a wet cloth.

Careful treatment during these finishing stages of producing an almost flawless concrete surface is just as important as it is throughout the entire construction job. For, in a sense, you are not patching—but perfecting your work. END

ALPHA

BETTER CONSTRUCTION THROUGH BETTER USE OF CEMENTS

news and notes from the field



Oneida Lake Bridge, Brewerton, N. Y., with a span of 320′, total length of 460′. General Contractor: Terry Contracting, Inc., Long Island City, N. Y. Consulting Engineers: Summers, Munninger and Molke, Albany, N. Y.

4000 p.s.i. Concrete before post-tensioning

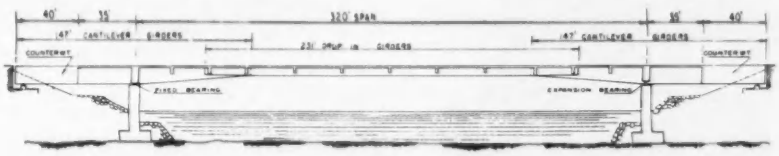
Longest Prestressed Span in United States

Now under construction, the Oneida Lake Bridge will carry the Empire Stateway Interstate Route 505 across the longest prestressed concrete bridge span in the United States. Alpha Portland Cement (Type II) has been selected exclusively for this structure.

Present plans call for 4000 p.s.i. concrete strength before post-tensioning.

Two separate structures. The Oneida Bridge is actually two separate parallel structures, one for northbound and one for southbound traffic. Cantilever end girders will support drop-in center girders, with cantilevers counterweighted at the abutments.

Three job-site casting beds. Two casting beds will be used for the I-shaped cantilever girders which will be 14′ high and 147′ long, weighing 250 tons each. There will be 12 on each side. They will be cast on the site, rolled forward and positioned. The T-shaped center or suspended beams will be cast in the third casting bed. They will be floated to the center and lifted into position. These will be 231′ in length and will weigh about 222 tons each. They will overlap the cantilevers by 25′ on each end (per sketch). There will be a total of 10 of these suspended beams.



LONGITUDINAL SEC.

Note: This mix was designed for this particular job only and is not intended for use on other jobs.

Proposed Concrete Mix—1 Cu. Yd.

Cement (Alpha Type II)	7½ bgs.
Sand (Surface dry)	1,280 lbs.
Crushed Stone (#4 to ¾″)	900 lbs.
Crushed Stone (⅜″ to 1″)	900 lbs.
Total Water	36 gals.
Slump	3″

Alpha Field Engineer on the job from the start

An Alpha Field Engineer was on the Oneida Bridge job at the very beginning assisting with various preliminary tests.

On this job, the contractor and consulting engineers are responsible for the mix design which was worked out with the assistance of an Alpha Field Engineer. The tentative mix for the prestressed members is shown below. For 4000 p.s.i. strength at an early age, a 7½ bag cement factor is proposed.

Alpha customers have learned to expect not only finest quality cements, but on-the-job engineering assistance to insure best procedure, best results. Ask your Alpha sales representative about the wide variety of helpful services available to users of Alpha cements, or write to Alpha Portland Cement Company, Easton, Pa.

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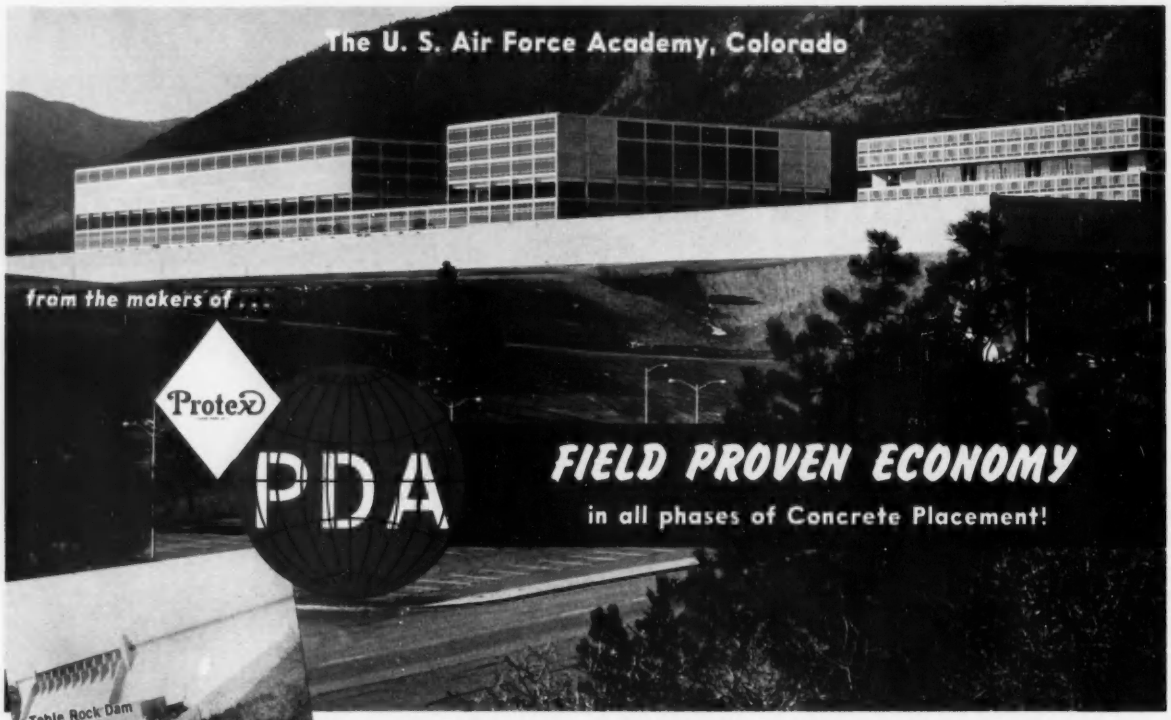

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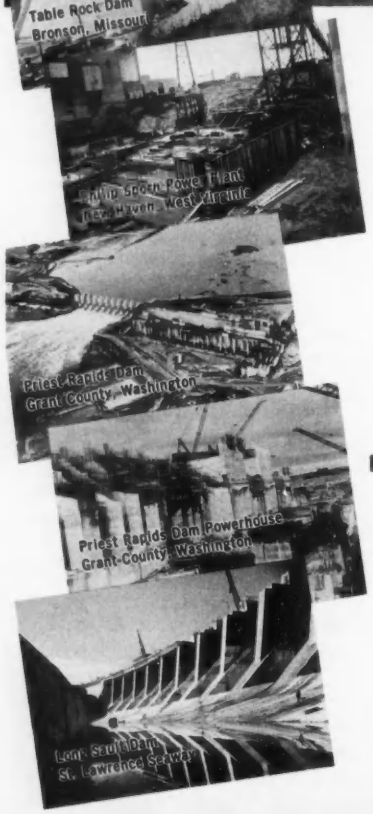

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*T.M. Reg.

A close-up of one of the precast arched frames showing the vertical column prestressing cables (encased in steel and later filled with grout) and the horizontal cables supported by steel hangers. The hoisting rig is visible on the left of the picture.

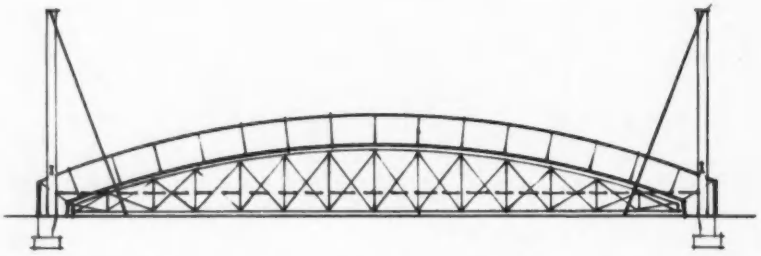
NOVEL CONCRETE ARCHES

A "FACTORY TO MAKE FACTORIES" is how Matthews and Mumby Ltd. describe the new precast concrete plant which they erected recently at Denton, near Manchester. The firm has an outstanding reputation in the British Isles for their precast structural building frames, but it is interesting to note that the precasting work on the structure in question was all done at the job site. To allow complete mechanization with unrestricted working space and a high daylight factor three of the buildings were designed as a series of 90-foot span concrete arched frames linked by hipped double glazing. The buildings consist of a 250-foot long casting shop, a 150-foot barbending shop, and a 50-foot mechanics shop.

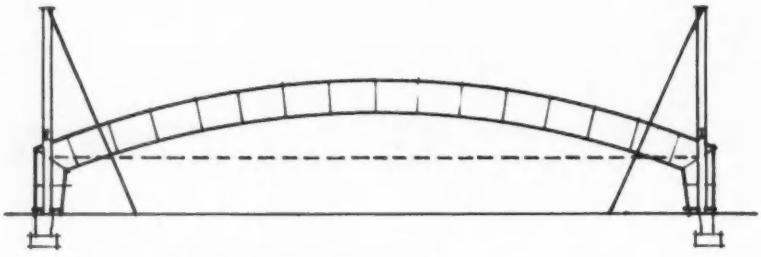
The arched frames were entirely precast and were tied with external prestressing cables at the intersections of the arches and their columns. The glazing spans 10 feet and is continuous across the 90-foot width of each build-

Interior view of the completed casting shop. Note that even the monorail tracks are supported by concrete beams. Each arched frame consists of 22 precast concrete elements.

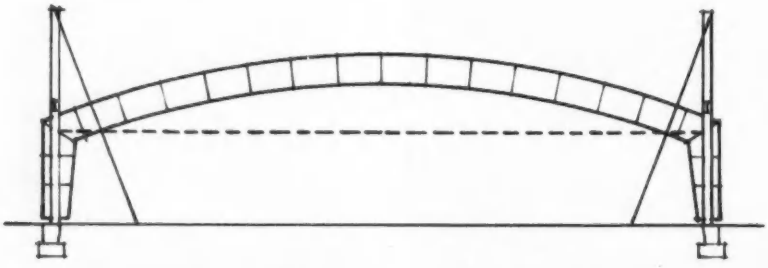
Stages in the Erection of a Prestressed Precast Arch Frame



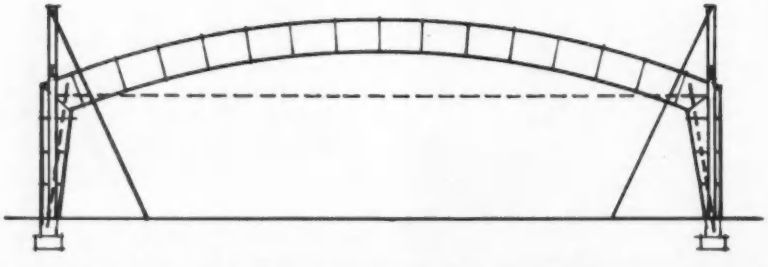
STAGE 1: The 22 arch elements are assembled and mortared together on scaffolds. Two prestressed cables tensioned (horizontal dotted line).



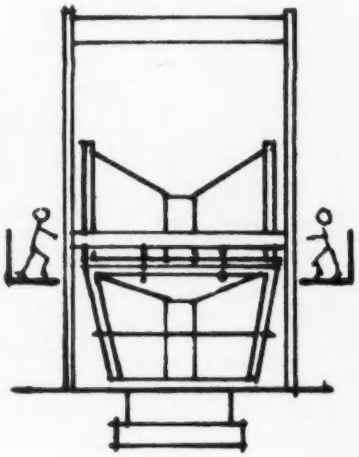
STAGE 2: Arch lifted approximately 4 feet 9 inches and one column element attached at each end.



STAGE 3: Arch lifted further 4 feet 6 inches and second column element added at each end.



STAGE 4: Arch lifted to final position, last column elements attached. Vertical prestressing cables inserted and tensioned (vertical dotted lines).

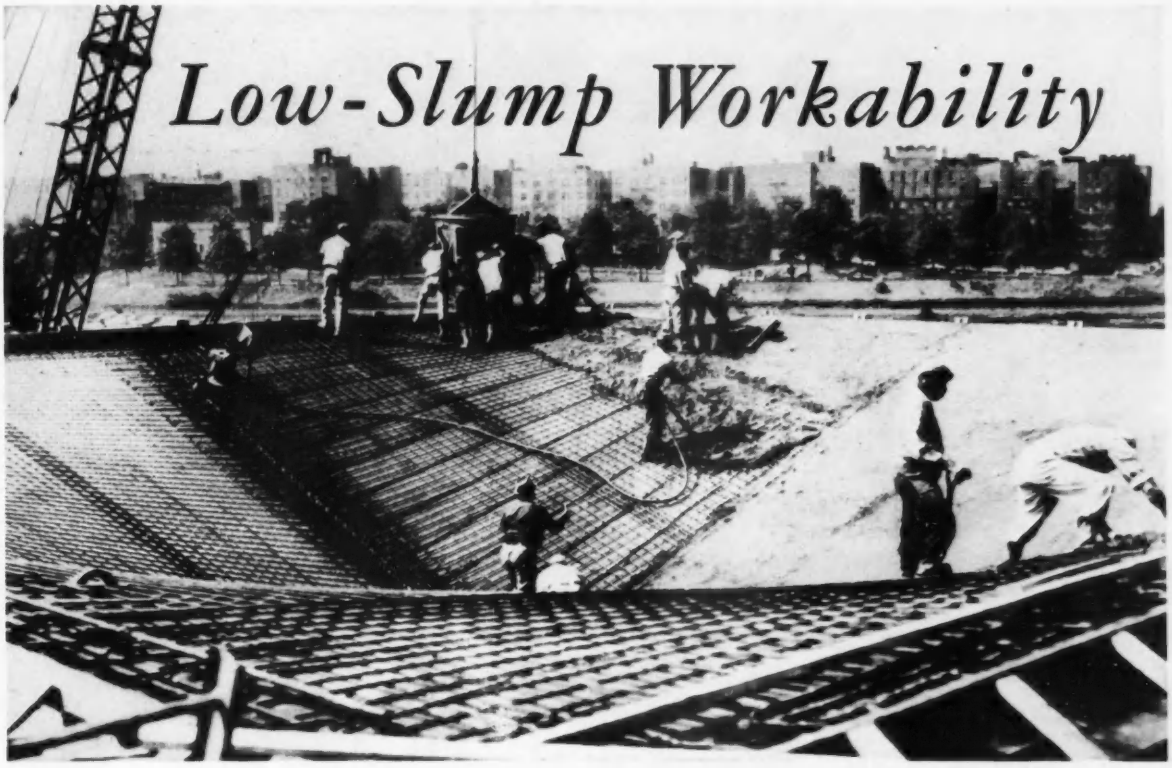


End Elevation

ing. Each frame is 15 feet wide and has a V section which acts as a reflecting surface to eliminate glare. Hangers from the prestressed ties which link the springings of the arches support 25-foot span precast beams carrying monorail track; this track actually creates a Venetian blind effect across the roof glazing.

Each arched frame consists of 22 precast elements — fourteen identical center elements, 6 feet long by 15 feet wide; the two end blocks of the arch; and three V section tapered column elements. To reduce handling weight the arch elements were given ribbed upper surfaces which were filled with concrete after erection. There are four external prestressing cables to each column and four horizontal cables forming the tie between the springings of an arch. The column cables were anchored in the corner element between arch and column, and in the footing of the column.

The precast elements of a frame were cast at the site in timber forms as near to their final positions as possible. The method of erection was to place all the arch elements in position on a trestle at ground level and to mortar them together. Then, after the joints had hardened, two of the four horizontal cables were stressed. The arch was then raised by hydraulic jacks and the column elements were positioned. The complete frame was then lowered on to its bearings and the vertical column cables were stressed. By use of the special hoisting rig it was possible to erect two frames each working week. The various stages of the erection process are shown in the accompanying sketches. END



This hyperbolic paraboloid, spanning 60 feet, is one of six for the new library of Hunter College, New York City.

Architect:
MARCEL BREUER, FAIA
Consultant: Eduardo Catalano
Associate: Robert F. Gatje
Consulting Structural Engineers:
FELIX CANDELLA; FARKAS & BARRON
General Contractor:
LEON D. DeMATTEIS & SONS, INC.
Concrete Contractor:
DIC CONCRETE CORP.

...with PLASTIMENT

The problem, to place lightweight Lelite concrete on steep slopes — as much as 45° — for the 3½ in. thick hyperbolic paraboloid roof of the new Hunter College library . . . Good workability at low slumps and a cohesive mix were vital . . . Plastiment retarding densifier, added to the mix, gave the desired workability at 2-inch slumps, and rapid clear-water bleeding for stability on steep slopes, resulting in sound concrete . . . Strengths of 3000 psi were obtained in 7 days.

Plastiment controls the hydration of cement by retarding and reducing cement gel formation . . . It does not entrain air so that proportions can be varied to meet job conditions . . . Workability is greatly increased so that even stiff mixes are readily compacted . . . In addition, it reduces cracking, increases strength and provides more uniformity in a concrete member.

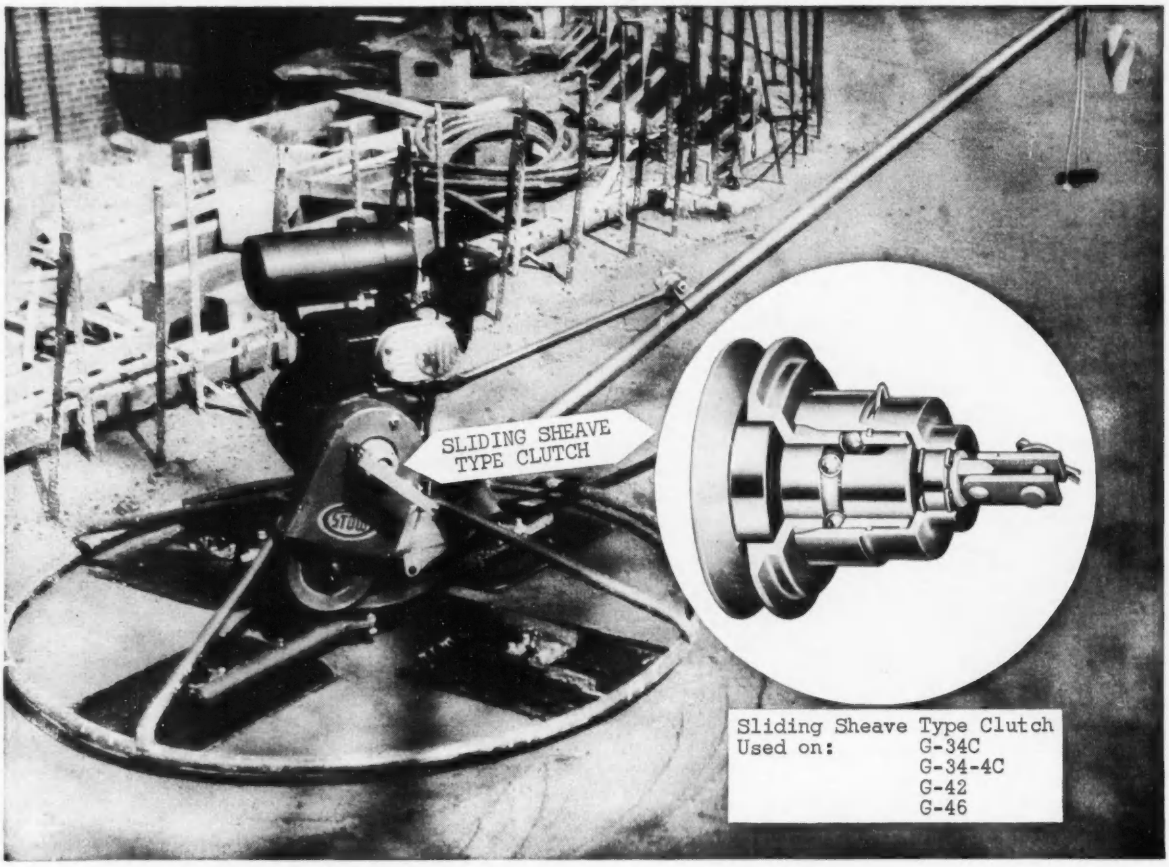
Call Sika direct or nearest distributor for catalog and technical information and service.

Other Sika Admixtures:

SIKACRETE	SIKA AER	INTRAPLAST	SIKA NO. 1
Accelerating Densifier	Air Entraining Resin Solution	Expanding Grouting Aid	Integral for Cement Mortar

RELIABILITY
•
EXPERIENCE
•
SERVICE

Sika
SIKA CHEMICAL CORPORATION
PASSAIC · NEW JERSEY
COMPOUNDS FOR MASONRY and CONCRETE CONSTRUCTION
DISTRICT OFFICES: ATLANTA • BOSTON • CHICAGO • DALLAS • DETROIT • NEW ORLEANS • PHILADELPHIA
PITTSBURGH • SALT LAKE CITY — DEALERS IN PRINCIPAL CITIES — AFFILIATES AROUND THE WORLD



EXCLUSIVE MANUAL CLUTCH MAKES STOW TROWEL TOP PERFORMER

Contractors and builders who have used them tell us that STOW Roto-Trowels do the fastest, most economical job on floating and finishing operations.

One big reason for this top performance is STOW'S exclusive manual clutch control which permits easier engine starts at any throttle setting, higher efficiency, less maintenance, faster and smoother finishing operations. The STOW Roto-Trowel is safer too, since the manual clutch automatically stops blade rotation within 1/6 second after the operator releases the handle, without stopping the engine!

Highly maneuverable, the STOW Roto-Trowel features a pitch control on the handle, so operator can change blade pitch easily, while the blades are in motion. Fixed guard ring permits working right up to walls and supports without danger.

STOW Roto-Trowels are available in 9 different models, ranging from 29" to 46" diameter, with 3-blade or 4-blade trowel assembly. For additional information contact your nearest STOW Distributor or write Stow Manufacturing Co., Binghamton, N.Y.

STOW Manufacturing Company
Dept. E-5, 354 Shear St., Binghamton, New York

Please send me Concrete Equipment Catalog 580 and name of nearest distributor.

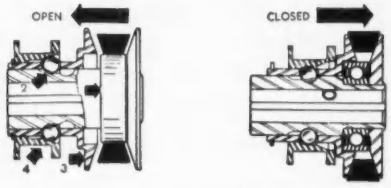
NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

HOW IT WORKS



When the Clutch is disengaged, the sheaves of the pulley are open as shown. The belt rides slack on the outer race of a free running ball bearing.

To start trowel blades, the operator engages the clutch. The sliding sheave which is mounted on ball bearings is carried forward into the closed position. This forces the belt up off the bearing so that it grips the sidewalls of the pulley.

This smooth clutching eliminates grab, results in a slow even start. With this clutch, belt life is increased since there are no belt stretching problems.

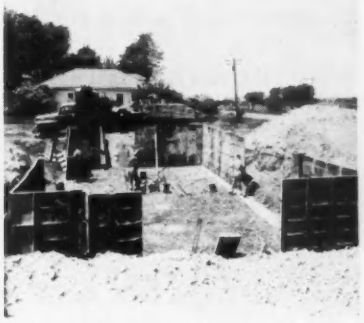
To stop the trowel, the operator lets go of the clutch control. Instantly, the belt pushes the sliding sheave back to the open position and rides free on the idler bearing.

STOW MANUFACTURING CO.
Dept. E-5, 354 Shear Street
BINGHAMTON NEW YORK

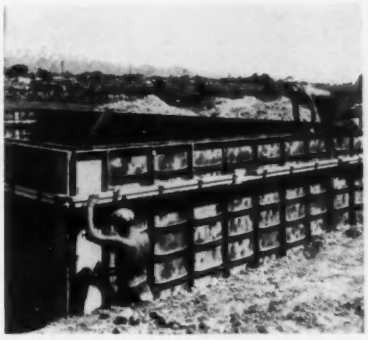
9 to 11 House Foundations Every Week with 5000 sq. ft. of SYMONS Steel-Ply Forms

Pouring 9 to 11 house foundations a week is a regular occurrence in the sparsely populated area of Logan, Utah. In fact, Morris J. Smith, the concrete contractor, and his crew with about 5,000 square feet of Symons Steel-Ply Forms have poured more than 400 foundations in 2 years. The plywood has not been turned and is still good for many more pours. Here is a typical example of how Smith achieves speed and economy in his concrete work:

It's 9:00 A.M. . . . Flatbed trucks back on to job. Compartments built on the trucks, separate fillers and panels. Fillers are loaded on the front end and the full size panels are loaded on the back. The truck is used as a warehouse, with each filler and panel having its own specific place. This helps to speed loading and unloading.



Setting up Four Corners Starts Erection. Each outside corner is erected by one man. The men do not work in pairs . . . each works singly. The outside walls are erected first. By starting at the corners, the men meet in the middle, insert the size filler it takes to finish the foundation . . . forming is completed and ready for pouring.



Double 2 x 4 Walers for Alignment. Walers are placed 18" from the top of the 8' panels. There are no walers at the bottom. Waler plates are hung on cross members which helps speed erection. When stripping the forms, buckets are placed close at hand for holding the wedges, waler plates, connecting bolts.

11:00 A.M. Foundation Ready to Pour. Yes, just 10 man-hours to set up 2,000 square feet of forming. And it's an everyday occurrence. Paying local rates ($3.00 an hour) cost of erecting is 1½c a square foot. Stripping in 8 man-hours costs about 1c a square foot. Pouring takes about 6 man-hours.

Stripping and Loading Forms and Fillers. Two men on the outside wall, two men on the inside wall stripping the forms. One man on the flatbed truck loading in a neat, orderly manner. This eliminates stacking, restacking and piling . . . all extra handling operations which cost money. Forms are cleaned before loading on trucks.

24 Man-Hours Later . . . Completed Foundation. Morris J. Smith is an excellent example of a concrete contractor who has put the Symons Forming System to work efficiently and profitably. 9 to 11 house foundations, similar to the one shown above, are poured every week by Mr. Smith and his crew.

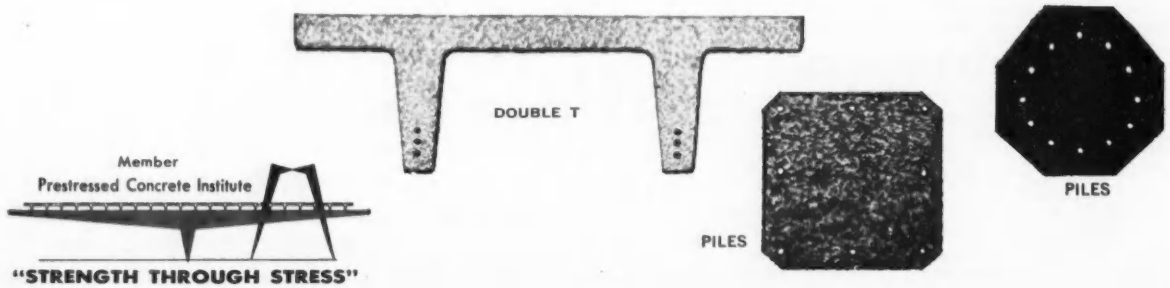
NOW! A NEW SOURCE FOR PRESTRESSED CONCRETE STRAND

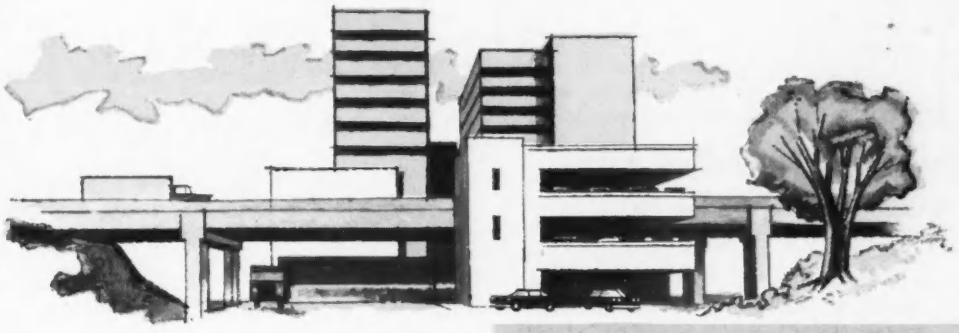
Quality materials, modern equipment and the expert craftmanship of an experienced major steel company—JONES & LAUGHLIN—guarantee a prestressing strand that will satisfy your most rigid requirements. All orders and inquiries given prompt attention. Write or call your nearest J&L District Sales Office now!

PHYSICAL PROPERTIES AND LOAD TABLE

Strand Diam. (In.)	Wt. Per 1000' (Lbs.)	Approx. Area (Sq. In.)	Minimum Breaking Strength (Lbs.)	Loads at Following Percentages of Minimum Breaking Strength (Lbs.)		
				60%	70%	80%
¼	122	.0356	9,000	5,400	6,300	7,200
5/16	188	.0578	14,500	8,700	10,150	11,600
3/8	274	.0799	20,000	12,000	14,000	16,000
7/16	373	.1089	27,000	16,200	18,900	21,600
½	494	.1438	36,000	21,600	25,200	28,800

Approximate Modulus of Elasticity: 27,000,000 psi.





Typical applications for prestressed concrete made with J&L Prestressed Concrete Strand

- Highway Bridge Girders
- Precast Piles
- Structural Sections for Buildings
  - Precast Beams
  - Precast Girders
  - Precast Columns
- Roof Deck Members for Buildings

Applications Under Development:

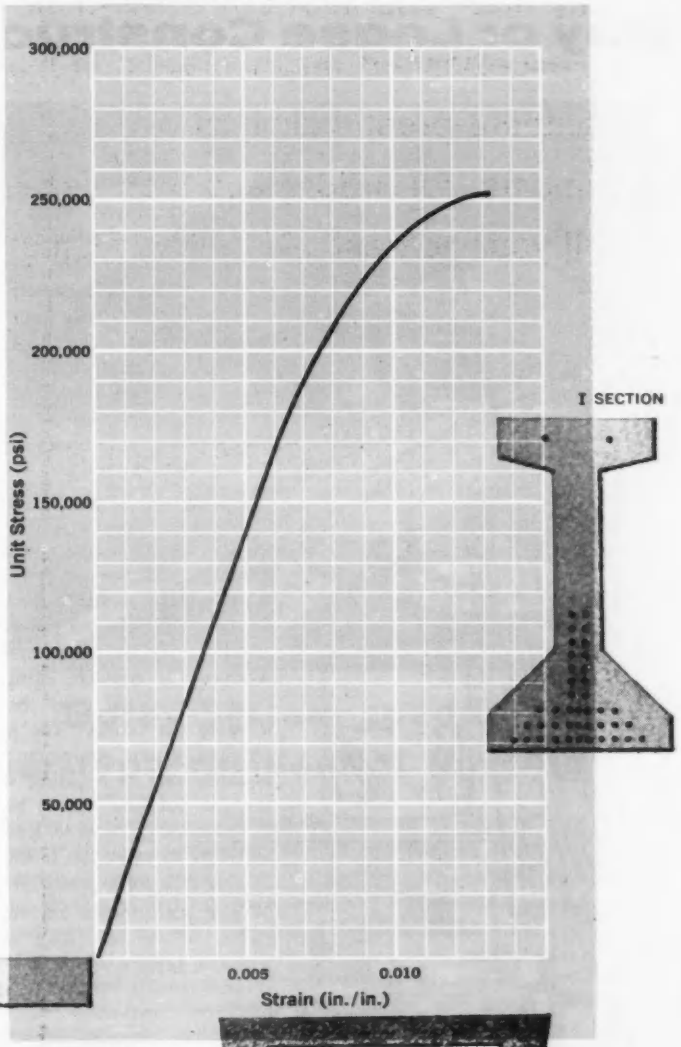
- Railroad Ties
- Utility Poles
- Highway Pavement
- Airport Runways
- Marine Structures

STANDARD REEL LENGTHS

Strand Diam. (In.)	Length (Ft.)
¼	25,000
5/16	15,000
3/8	10,000 and 15,000
7/16	8,000, 10,000 and 12,000
½	6,000 and 9,000

At least 90% of the order will be furnished in specified reel lengths. At the manufacturer's discretion, not more than 10% of the total length ordered will be furnished in lengths shorter than specified but in any event, not less than 2,000 feet long.

Other reel lengths and packaging available upon request.

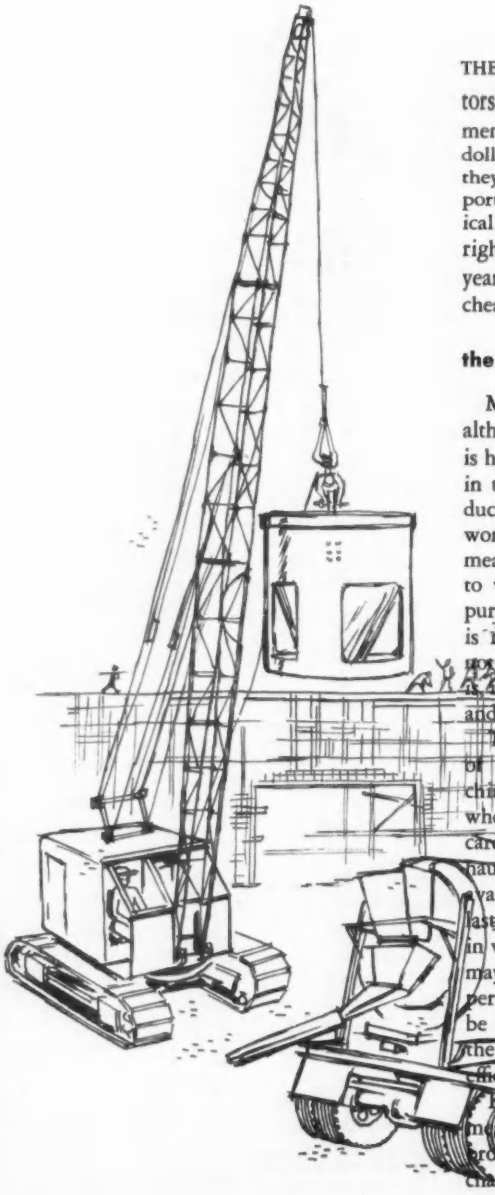


Jones & Laughlin Steel Corporation
PITTSBURGH, PENNSYLVANIA

J&L STEEL

In the face of today's rising costs, many contractors are confronted with an important question—whether to . . .

Buy or Lease Construction Equipment?



THE CONTINUOUS NEED of contractors for efficient and up-to-date equipment to complete the thousands of dollars in concrete construction jobs they handle each year imposes an important question. Is it more economical to purchase such equipment outright, depreciate it over a period of years, and then replace it; or is it cheaper to operate under a lease plan?

the problems of purchasing

Most contractors would admit that although the cost of new machinery is high, it is well worth the investment in terms of increased power and productivity. To take on a job with either worn-out or obsolete equipment can mean operational costs that threaten to wipe out profits. The problem of purchasing new equipment, therefore, is rarely one of deciding whether or not the purchase should be made. It is, instead, a problem of deciding when and how to make the replacements.

This calls for a pretty close analysis of the performance of various machines. If the contractor is to know when to replace a machine, he needs careful records on repairs and overhaul, on down-time because of unavailability, on reduced efficiency, and last, but far from least, on its trade-in value. A concrete finishing machine may give excellent service over a period of ten years, or it may need to be replaced in four to five years if the contractor is to operate at top efficiency.

Knowing when to replace old equipment is only half the battle. Other problems arise at the time the purchase must be made. Will the heavy outlay of cash consume most or all of a contractor's capital? Are the depreciation reserves adequate to cover replacement costs? More often than not, these reserves are not adequate because of the sharp increase in new equipment prices. As a result of these problems that come up at the time replacements should be made, many contractors find they must continue to operate with obsolete machines because the cost of new ones is too high.

the advantages of leasing

In recent years, a new and highly adaptable arrangement for supplying the contractor with the costly equipment he needs to do business has come along in the form of the lease plan. Under a lease arrangement, the contractor acquires the machinery he needs on a rental basis.

The chief advantage of this arrangement is that it frees working capital for other uses. Working capital thus freed might be used more profitably for expanding business, for taking advantage of all trade discounts, or for building a reserve against seasonal drops in construction. Moreover, working capital retained in the business may be employed to produce yearly earnings for the contractor.

Another advantage of leasing over the cash purchase of new equipment is that it protects the balance sheet position. Since it generally does not appear on the balance sheet (or if it does appear, it is in the form of a footnote disclosing the lease transaction and amount of lease rental payments due per annum), leasing does not affect financial ratios, particularly

the working capital ratio. Through leasing, it is therefore possible to finance expansion or modernization without impairing a company's ability to borrow.

An example can be found in the following case history. A highway construction contractor needed new equipment, but to live up to the requirements of a large road-building contract he could not afford to impair his net working capital position. Acting upon the suggestion of a manufacturer who used a lease plan, he found that he was able to get the new equipment and at the same time protect his balance sheet position. Through the lease method, he bid successfully for the road contract. This expansion of business would not have been possible for him, either through cash purchase or debt financing. For either of these two methods would have reduced his net working capital to a figure below that required by his bonding company.

Still another value of a lease arrangement is that it acts as a hedge against inflation. Contractors, like all businessmen, are sometimes inclined to lose sight of the effects of inflation on the true value of fixed assets. In a period of inflation, the buying power of the dollar at the time assets are acquired is greater than at the end of the life of the equipment. Since the unit payments of the lease are constant throughout the base years and the renewal periods, obviously the lease payments are made with cheaper dollars.

In addition, leasing will eliminate the risk of operating with obsolete equipment. It will increase production through the modernization of equipment. The greater efficiency thus achieved may actually result in savings that are almost equal to the lease payments.

As opposed to the acquisition of equipment through cash payment or a term loan, leasing will simplify cash accounting by allocating equipment costs to specific contracts. It will lower the cost of purchasing, operation, and equipment-maintenance records. In overcoming the high initial costs for new equipment, it permits the contractor to expand out of future earnings (as in the case of the contractor who landed the road-building job), and to write off production equivalent costs at the time best suited to his income.

how leasing works

Leasing is a fairly simple arrangement. The lessee determines exactly what equipment he wishes to acquire, what it costs, who the supplier is, and what the terms are for the lease he desires.

He may arrange a plan for three or more years, and he may have renewal options at greatly reduced rates. The most popular lease is on a three- to five-year basis, renewable at nominal rates.

The total cost of the lease is the original cost of the equipment plus a moderate leasing fee for the term of the lease. It is assumed that lease payments meet the test of IRS (Internal Revenue Service) rulings and are deductible for tax purposes.

In evaluating the problem of whether to lease or buy equipment, the important thing to consider is *relative cost*. If a contractor takes $100,000 out of his liquid working capital and uses it to acquire new equipment, he is obviously paying *something* for the use of that money. Since every dollar of liquid working capital has earning power, the investment of $100,000 in new equipment must return to the

Rental Rates for Typical Concrete Construction Equipment

Equipment Item	Size	Per Month	Per Week	Per Day
BUCKETS				
bottom-dump*	under ½ cubic yard capacity	$ 36.50	$13.00	$ 4.55
	1 cubic yard capacity	64.25	22.50	8.30
CARTS				
hand-operated	6 cubic feet with two rubber-tired wheels	19.50	7.20	2.55
power operated—walking type	all sizes	118.00	42.00	13.75
FLOOR FLOAT				
gasoline or electric	18 inch compactor	86.25	31.50	10.25
FLOOR TROWELING MACHINE				
gasoline or electric	24 to 26 inch diameter with three blades	79.00	27.75	9.20
SCREEDS, VIBRATING				
gasoline—single beam	6 feet in length	67.00	22.25	7.20
VIBRATORS (flexible shaft)				
electric powered**	from and not including ⅜ hp to and including ⅝ hp with shafting length up to 18 feet	58.25	20.25	6.85
gasoline powered	up to and including 1½ hp with shafting length up to 18 feet	73.00	25.25	7.95

*Show a drop in rental rates during 1958 of 1-4% on some sizes and an increase of 1-5% on others.
**Show an increase in rental rates during 1958 of 7-10%.

company at least the same profit which the company can earn with this $100,000 in other ways.

How much net profit does the typical construction contractor earn on working capital? The Dun & Bradstreet figure is 15.11 percent for recent years. This percentage refers to profits after taxes. If a contracting firm is in a 52 percent tax bracket, the profit before taxes on net working capital is approximately double that cited by Dun & Bradstreet. Therefore, a contractor, in asking himself whether to lease instead of using his own working capital to purchase new equipment, must be able to lease at less than the 30 percent profit his working capital could earn before taxes.

If leasing costs more than he can earn on working capital, he should use his own capital to purchase. If, on the other hand, additional equipment can be "acquired" through leasing at less than he can earn on use of his own working capital, it is sounder to lease. A prospective lessee will find that projections based on his own records is the only sure and realistic way to analyze the most desirable financing method for him to consider.

a specific leasing plan

One of the major leasing organizations in the country is the United States Leasing Corporation, with offices in all principal cities. They have handled lessees ranging in unit size from $5,000 to amounts in excess of $1,000,000, with a "small lease" plan available in special situations.

The United States Leasing Corporation will lease any machinery or equipment required in the course of industry or trade. A few examples of equipment they will lease include: compressors, conveyors, cranes, fork-lift trucks, heating equipment, material-handling equipment, power shovels, and tractors.

Initial lease periods range from three to ten years, dependent upon the type of equipment and the needs of the lessee. In special situations this range may be shortened or extended. The usual lease is five years.

All lessees carry an option to renew on a year-to-year basis at a greatly reduced annual rental rate. The United States Lease Corporation will also include, under certain conditions, an "Option to Purchase"—to be exercised by the lessee at any time during the initial lease term, at the end of the initial lease term, or any subsequent renewal period.

Insurance, maintenance, and property or sales taxes under the United States Leasing Corporation Plan are the responsibility of the lessee. However, all dealer or manufacturer guarantees, warranties, and services are passed on to the lessee, with the same effect as a direct purchase by the user.

Under a special Master Lease Plan, a lessee may consolidate various types of equipment under one lease, whether they be acquired simultaneously or individually over a period of months or years. This means that once a Master Lease goes into effect, the lessee may add equipment as needed over an extended period of time under the terms of a permanent contract.

If you think a leasing arrangement has possibilities for your own situation, further information on the United States Leasing Corporation and its lease program can be obtained by writing to *Herbert Cerwin and Staff, Phelan Building, San Francisco 2, California.* END

Construction Equipment Leasing Reaches All-Time High

Long-term leasing of production equipment by the construction and road-building industry spurted to an all-time high in 1958, despite the recession. Total dollar volume of equipment on lease in the construction and road-building industry reached $42 million in December, 1958, as compared with $40.5 million a year ago, a gain of 3.5 per cent.

The increase was disclosed by Robert Sheridan, president of Nationwide Leasing Company, Chicago, major equipment leasing company which regularly surveys leasing trends throughout the country. Sheridan reported that the total dollar volume of equipment on lease reached approximately $227 million in December, 1958, a gain of $47 million, or 26 per cent, in one year.

The construction and road-building industry ranked among the first 10 users of leased equipment, Sheridan said. Leases in the construction and road-building industry ranged in size from $10,000 to $4,000,000. Leases covered single pieces of equipment and entire plant divisions, he added.

Covered by the survey are long-term leases, ranging three years and longer, of all equipment except cars, trucks, buildings, and real estate, Sheridan said. Only "true leases" are counted in the survey, Sheridan pointed out. He added that instalment purchases of equipment under the guise of leasing are not considered leased equipment.

The leasing increase has been general throughout industry and not confined to any single group, Sheridan said. He stressed that the growth had occurred in the face of a general decline in capital spending throughout the year.

"With business conditions improving, I expect that 1959 will show a still greater gain in equipment leasing than did 1958," Sheridan said. "In all probability, the total dollar volume of equipment on lease by the end of 1959 will top $300 million."

The leasing firm cites five reasons why leasing is gaining popularity:

1. Profit-producing equipment is put to work without capital investment. This is particularly important since working capital remains tight, despite the slight improvement resulting from inventory liquidation.
2. The growing volume of governmental work has caused industry to turn to leasing equipment, rather than purchasing it, because of uncertainty of government orders being renewed.
3. The rapid rate of obsolescence of production equipment and the necessity to cut costs to remain competitive.
4. Manufacturers of production equipment are using leasing as a primary sales tool.
5. Greater use of the sale-leaseback of *existing* equipment to create working capital.

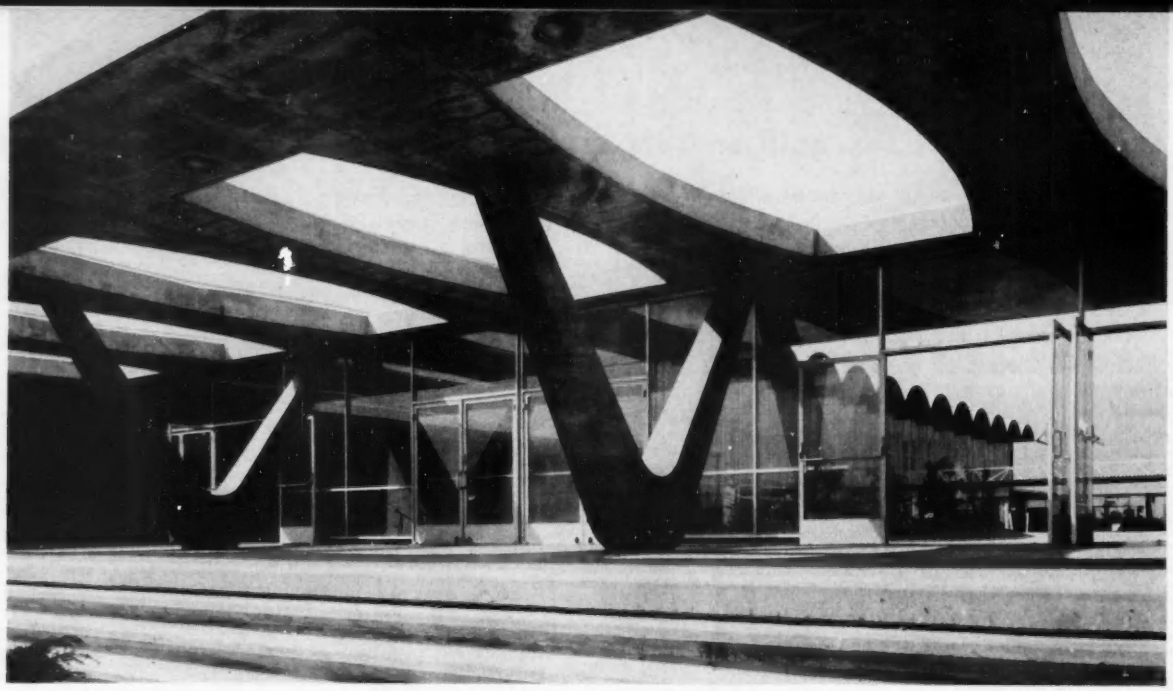
ACI Standards In Spotlight At 55th Convention

Several important actions relating to recommended practices were taken at the 55th annual convention of the American Concrete Institute, held at Los Angeles in February. The several proposed Standards and revisions will now go before the membership for ratification by letter ballot.

The Institute revised its Standard on measuring, mixing, and placing concrete (ACI 614-42). This latest report of ACI Committee 614 has been updated to include an outline of practices which have generally been found desirable for first class results in measuring and mixing ingredients for concrete, and when placing it in the work. Although many of these recommendations are applicable and should be used in connection with special types of concrete, it is conventional concrete to which they specifically apply. This proposed revision presents a comparatively high standard of practice rather than common practices; recommendations are therefore made with the thought of permitting the user flexibility in his specifications to the extent he considers worthwhile.

Also adopted as a standard was a recommended practice for hot weather concreting. This Standard provides information useful in minimizing detrimental effects of hot weather on concrete. Means are described for reducing concrete temperature by proper attention to ingredients; methods of production and delivery; and care in placement, protection, and curing. Information is given on the use of admixtures to reduce mixing water requirements and to retard setting. Emphasis is given to the importance of meticulous attention to the use of standard procedures in testing concrete made in hot weather.

A recommended practice for mix proportioning for structural lightweight concrete was also adopted at Los Angeles. This Standard is intended as a supplement to the ACI Standard "Recommended Practice for Selecting Proportions for Concrete" (ACI 613-54) and describes a procedure for proportioning structural grade concrete containing lightweight aggregates. This procedure does not require the use of values for specific gravity or absorption of the aggregates but utilizes a specific gravity factor.



concrete high school wins honor award

Built largely of "flat slab" concrete, cast in place at the job site, this Westmoor High School in Daly City, California, won for its designer, San Francisco architect Mario J. Ciampi, a first honor award in the 1958 American Institute of Architects honor awards competition. Built by Theo G. Meyer & Sons at a construction cost of $14.72 per square foot, the two-million dollar structure has a cantilever all-concrete roof. The long-span high rooms are roofed with thin-shell concrete precast barrel vaults and the exterior walls are of colored masonry with glass areas framed in aluminum. Cost of the structure per student amounted to $1,664.

letters

floor blisters diagnosed

Sir:

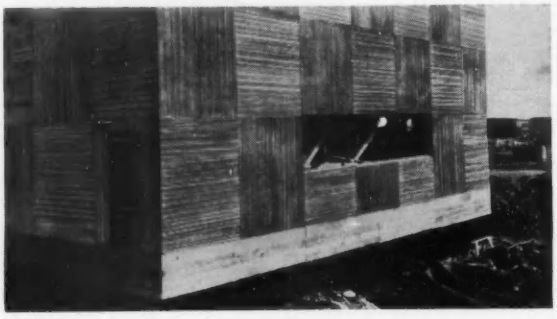
A recent issue of *Concrete Construction* (February, 1959, page 23) contained a letter from J. V. Bonny of the Maher Construction Company, Denver, regarding blisters on a concrete floor. As you mentioned, diagnosis from a distance is always risky business, but I will gamble and offer some comments.

The condition which Mr. Bonny describes seems to be somewhat similar to conditions which we sometimes find when waterproofing brick walls and the like. The waterproofing material, whether it be a silicone, wax or asphalt membrane, prevents moisture from passsing through the brick or masonry. The water often carries salts in partial solution and these become trapped behind the waterproofing barrier. The time required to build up a sufficient quantity of salts to a point where it will exert pressure in excess of the strength of the brick or masonry will depend upon the concentration of the salts and the amount of moisture present. This action, in the case of brick walls, generally takes anywhere from a year to four years to evidence itself.

The condition noted by Mr. Bonny and other Denver tile contractors could well be brought about by the fact that the surface of the concrete floor has been sealed by the tile and the cement used to lay the tile. Hence, water penetrating the concrete from the alkali soil could well deposit a sufficient concentration of salt to cause blisters. This is further substantiated by the statement that there have been no blisters in the areas that are not covered by the asphalt tile.

I would suggest that to prevent this action from taking place a water-impervious membrane be laid on the base before placing the concrete. It would also be desirable to bring this membrane up around the periphery of the slab to prevent the alkali waters from entering the sides, as well as the bottom of the slab. A very dense well-compacted concrete mix would also probably prevent this condition.

MELVILLE E. PRIOR
Construction Chemicals Department
Dewey and Almy Chemical Division
Cambridge, Mass.

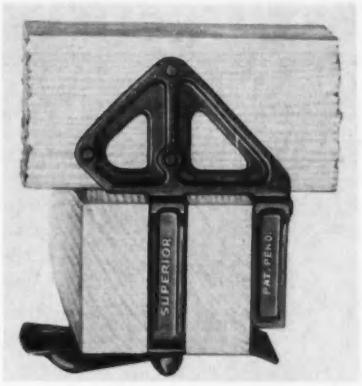


new grinding wheel

Designed specifically for concrete work, this cup grinding wheel is reported to speed up work for the contractor by at least 30 percent. It can be used for either wet rubbing or dry grinding on electric tools, air tools or Stow flexible shaft machines. It is said to provide 10 percent more grinding area and 94 percent more usable grinding material than the conventional cup wheel. The diameter of the wheel is 6 inches and the maximum speed is 6048 rpm. Stow Manufacturing Company, 354 Shear Street, Binghamton, N. Y.

plywood forms

Weldwood Formtex concrete forms were used in this Air Force building to create this grooved-patterned exterior finish. It was only necessary to patch tie rod holes and occasional honeycomb spots. Sack and rub treatment was eliminated. Four other types of plywood concrete forms make other decorative and plain finishes possible, including a type which reproduces the natural grain of the face fir veneer. All forms are re-usable. They are available in both exterior and interior grades. United States Plywood Corporation, 55 West 44th Street, New York 36, N. Y.



waler bracket

The use of a new waler bracket eliminates scaffold accidents due to separating of toe-nailed walers from the studs. The bracket is a heavy malleable casting which cannot bend or break and is indefinitely re-usable. It is applied independently of wall ties and clamps, permitting faster waler placement. It may be fastened on either side of the stud with three nails. Superior Concrete Accessories, Inc., 9301 King Street, Franklin Park, Ill.

bridge decks

A new low cost system of bridge deck forming for concrete roadways utilizes lightweight steel I-beams to support concrete bridge decking temporarily. A new type of falsework was designed by J. A. Tobin Construction Company using Jones & Laughlin Steel Corporation's Junior Beams instead of 1,325-pound steel purlins and wooden joists. The 14½-foot length of Junior Beam weighs about 100 pounds including wooden nailer strip on top. The ends of the Junior Beams are placed on double 2- x 8-inch wooden ledgers supported by Richmond Saddle Ty-Hangers hung over floor beams. Time for erecting falsework was cut in half. Six men stripped 17 Junior Beams and 18 plywood sheets in 20 minutes. Another advantage of the beams is their ability to withstand without damage the abuse of wrecking tools used in removing the beams, according to the contractor. Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.

tools and materials

curing agent

Improved curing, positive moisture control and easier parting of the world's largest pre-cast lift-slab panels resulted from applications of Thompson's Water Seal during construction of the new headquarters for the U. S. Geological Survey at Menlo Park, California, according to the contractor. The building employs four lift-slab roof panels and four second floor panels weighing 700 tons each. Thompson's Water Seal was used as a curing agent and bond breaker on each of the panels. E. A. Thompson Company, 1355 Market Street, San Francisco, Calif.

reusable forms

Over 600 pours with one set of concrete forms without deterioration is the report of S & I Construction Company of Crystal Lake, Illinois, regarding forms built of Georgia Pacific overlaid plywood and Symons Clamp and Manufacturing Company metal forms. The company states that the forms still produce smooth, grain-free concrete and strip and clean up almost like new. Georgia-Pacific Corporation, Dept. 13A, Equitable Building, Portland 4, Oregon.

spread footing forms

Designed to permit concrete footings and foundation walls to be poured at the same time, these spread footing forms are constructed for use with regular Efco form equipment. Construction is speeded up by eliminating the need for footings to harden before pouring walls. The forms are all steel, thus permitting re-use, and are available in various lengths. Economy Forms Corporation, Box 128-AF, H. P. Station, Des Moines, Ia.

culvert forms

Forms were erected and concrete poured for a 7- by 7-foot tunnel with a wall thickness of 9 inches and a length of 340 feet, the project requiring only three weeks. Walls and top slab were poured monolithically, in three pours. For this job the contractor used 3,800 square feet of Symons Steel-Ply forms and 264 lineal feet of culvert forms, after consultation with Symons' engineering service to insure a fast, economical job. Symons Clamp & Manufacturing Company, 4249 West Diversey Avenue, Chicago 39, Ill.

road roughness tester

Providing for the smoothest surface possible is one way of guaranteeing longer life for highways. Smoother, bumpless surfaces also provide better braking power, greater safety and tire economy for the motorist. Using the Road Roughness Indicator, the results of roughness measurements for types of pavement surfaces used on highways, city streets, airstrips and floors are reported, analyzed and correlated with the design features, age of the pavement and methods used in construction. The unit consists of a test trailer, ramp, electronic controls and recording unit, and a panel instrument truck. Soiltest, Inc., 2711 West North Avenue, Chicago 39, Ill.

literature

Construction handbook. Created for the architect, builder, engineer and contractor, a handy, pocket size book devotes over 40 pages to tables and charts for estimating building material requirements. Also included are mensuration tables, construction details and authentic data on painting and concrete work. The manufacturer's products for protection, preservation and decoration of concrete, metal and wood are described together with their uses, methods of application, coverage, colors and packaging. A. C. Horn Company, Subsidiary of Sun Chemical Corporation, 750 Third Avenue, New York 17, N. Y.

1959 tool catalogue. A new tool catalogue presents several additions to an extensive line of tools for the trowel trades. The book carries a full index, prices, specifications and instructions for ordering and is well illustrated. Goldblatt Tool Company, 1910 Walnut Street, Kansas City 8, Mo.

Insulating concrete. An 8-page catalogue, No. C11-1959, includes specifications for the mixing and application of insulating concrete made with Permalite expanded perlite. General characteristics of the material are also discussed. Engineering data charts provide complete information on composite roof deck systems using Permalite insulating concrete as fill over corrugated steel decking, structural concrete, paperbacked wire mesh, formboard systems, and rib metal lath. Data includes total safe uniform loads and physical properties of the finished deck. Mining and Mineral Products Division, Great Lakes Carbon Corporation. 612 South Flower Street, Los Angeles 17, Calif.

Rock drilling hammer. A pocket-sized folder provides specifications and operation details on the Thor No. 15 DL dustless concrete and rock drilling hammer and companion dust extractor. This inhaling air hammer drills holes 13/16 inches to 1⅜ inches dustlessly in maintenance, installation and repair work in homes and industrial locations. Thor Power Tool Company, 175 North State Street, Aurora, Ill.

literature

Power tool catalogue. A catalogue gives complete descriptions, data and specifications for Syntron electromagnetic electric hammers and hammer drills, electric saws, gasoline hammer paving breakers and rock drills, and concrete-working tools including electromagnetic concrete form vibrators, gasoline and electric concrete mass vibrators and vibrating concrete floats. Syntron Company, 323 Lexington Avenue, Homer City, Pa.

Internal gang vibration. A new bulletin on deep slab internal gang vibration gives complete information on the Stow BUSP electric vibrators, mounting frames, brackets, and generators. On-the-job photographs of the assembly with 10 vibrators for a 25-foot width slab on an airport runway are included. Complete information is given for selecting the right combination of components for any width slab. Stow Manufacturing Company, 354 Shear Street, Binghamton, N. Y.

Maintenance products. A 4-page brochure contains thumbnail descriptions of 21 products for plant maintenance and restoration. Products designed for floor treatment, waterproofing and dampproofing, roof coating, as well as paints and protective coatings are described. Specifications, application data, and information on special features are included. The bulletin thus makes it possible to quickly select the specific product to meet the most frequent maintenance or construction needs. L. Sonneborn Sons, Inc., Building Products Division, 404 Fourth Avenue, New York 16, N. Y.

Floor repair. Bulletin EQ-1 tells how to apply a durable, heavy-duty, non-slip, non-absorbent patch to damaged concrete flooring with Emeri-Quikpatch. Full directions on preparation, mixing and placing, curing and edging are included, as well as how to clean tools. The bulletin also describes composition of the package unit and tells how far a given amount of material will go in terms of floor space and depth of application. Walter Maguire Company, Inc., 60 East 42nd Street, New York 17, N. Y.

Bonding agents. "Bonding Banter" is issued quarterly by Larsen Products Corporation to illustrate and explain the applications of their liquid bonding agents, Weld-Crete, Plaster-Weld and Tile-Weld. The firm will welcome the addition of your name to their mailing list to receive this informative news sheet. Larsen Products Corporation, Bethesda, Md.

Crane accidents. Crane accidents growing out of the nation's expanding construction activity are causing work delays and economic losses that could in almost every instance be avoided. A bulletin reports an analysis of more than 1,000 injury-producing crane accidents, and reveals that at least 76 per cent of those studied resulted from human error. Of the remaining 24 per cent attributed to defective equipment, the bulletin indicates that most could have been prevented through better investigation of the accident potential of equipment. Liberty Mutual Insurance Company, Boston, Mass.

Radio equipment booklet. This publication is designed to give those who are planning communications systems the latest available information on standard models of two-way radio and optional types of equipment which can be provided for individual system flexibility. Included is information on the manufacturer's complete line of communications units, indicating the types of transistor powered models which are available and those which are powered by vibrators and dynamotors. General Electric, Communication Products Department, Electronics Park, Syracuse, N. Y.

Tool catalog. An illustrated catalog, "Remington Contractor and Industrial Tools," shows the complete line of this firm's precision-built tools and gives performance data and specifications. These tools are said to give long service with minimum maintenance. Mall Tool Company, Division of Remington Arms Company, Inc., Bridgeport 2, Conn.

Dodson's Digest

The Big Story

Bob "Scoop" Cooper, a newspaper friend of mine, phoned the other day. Wanted me to join him on a helicopter tour of nearby construction on the interstate highway system.

Before you could say "Calcium Chloride," we were sailing over four brand-new lanes of concrete.

"You know, Dod, this interstate system is a fabulous thing," Bob bubbled. "41,000 miles of highways that'll cost $40 *billion* dollars. Wow!" Bob was a very excitable fellow.

"And Calcium Chloride is playing a mighty big role in the highway program, too," I injected.

"How's that?" Bob questioned.

"Well, many big contractors mix Calcium Chloride into their concrete to make it more workable and . . . "

Just then our pilot swooped low over a big crew laying concrete.

Bob snapped two fast photos and scribbled a half-dozen lines in his notebook. "What a story," he enthused. "Good thing there isn't much dust or my pictures would be lousy."

"That's because they've spread around a layer of Calcium Chloride," I answered.

"More Calcium Chloride? How come you're so sure?"

"That's the Thompson outfit – see his name on the side of the trucks? He uses it to keep the dust down around his construction sites and puts Calcium Chloride in his concrete to give it higher early strength, greater final strength and . . . "

"Dod," Bob exploded, "there's a terrific little story in this Calcium Chloride! Why, it's one of the keys to a better interstate system! Let's go back to the Thompson crew. I want to get some closeup shots of exactly how they use Calcium Chloride."

A few moments later we landed quite close to where Thompson's men were working. Bob had fire in his eyes . . . visions of another great story.

Before we could stop him, he grabbed his camera and jumped . . . right into nine inches of fresh concrete!

– L. D. Dodson

P.S. — Write for our booklet, "How To Make Better Concrete Products and Ready Mix." It's packed with facts and ideas telling how *you* can improve *your* concrete. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

literature

Safety pamphlet. "Easy Does It," a pamphlet on the correct handling of industrial materials, states that one out of every four work injuries results from moving objects. Included are tips on how to pile and lift, plus rules for driving power trucks. National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill.

Concrete testing machines. A complete catalogue of laboratory, plant and job-site testing machines with collateral equipment for testing concrete pipe and drain tile, cylinders, blocks, cubes, beams and lintels is offered by Forney's Incorporated, Tester Division, P. O. Box 310, New Castle, Pa.

Correspondence course. A correspondence course, prepared by the Business Education Division of Dun & Bradstreet, Inc., is designed to help both the beginner and the professional in the field of finance and credit. It consists of 17 chapters—9 of which are devoted to financial statements, comparative analysis, working capital analysis, sales analysis, and the techniques and applications of analysis. The course, which has been thoroughly tested over a period of years and incorporates the thinking and suggestions of hundreds of credit analyses, is now being offered to the general credit public. Business Education Division, Dun & Bradstreet, Inc., 99 Church Street, New York 8, N. Y.

Year round concreting. An 8-page pamphlet entitled "Year Round Concreting" summarizes the American Concrete Institute's new standard recommendations for cold weather concreting. It tells how calcium chloride and other developments aid in placing durable, quality concrete in cold weather. The publication includes sections on accelerators, preparation before concreting, winter concreting objectives, and protection required. A 2-page chart illustrates the effect of 2 per cent calcium chloride on the strength of air entrained concrete with both Types I and III cement when temperatures are at 73, 55, 40 and 25 degrees F. Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Index to Advertisers

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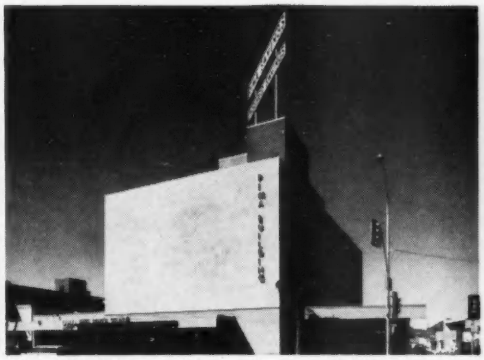

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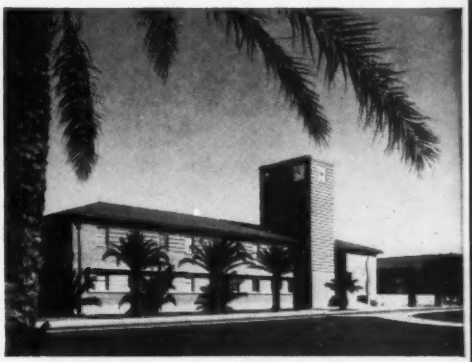

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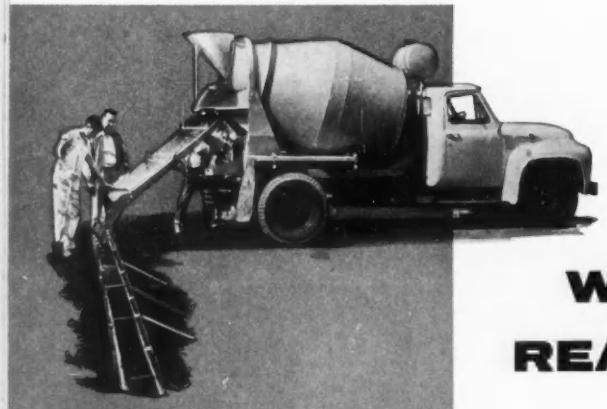

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Ready-Mixed Concrete is of high quality, accurately proportioned at a central plant with modern batching equipment. Each batch is designed for your specific job and is thoroughly mixed to insure concrete of uniform quality, durability and high strength.

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Ready-Mixed Concrete results in maximum convenience on the job. You don't have the problem of estimating the quantities of cement and aggregates required. You save the time, trouble and hard labor of handling and mixing materials. It does away with stock piles of aggregates and stores of cement that take up space on the job site. And too, there's no cleaning up of excess materials upon completion of the job. A phone call will bring the concrete to your job, and in many cases, it may be placed directly into your forms.

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Ready-Mixed Concrete avoids delays in placing operations because it is delivered when and where it is needed. It is ready to deposit in your forms immediately upon delivery, often without rehandling, thus speeding up operations. The exact quantity of concrete needed is delivered directly to the job site—construction crews lose no time in waiting to start or finish a job.

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